WHAT IS CLAIMED IS:

1. A method of measuring a thickness d of a liquid crystal layer having alignment-treated upper and lower surfaces and a birefringnet index Δn which is uniform in the thickness direction, in a reflection-type liquid crystal display element including said liquid crystal layer between a pair of substrates and having a reflection region at least in a part of one of said substrates, comprising:

a light-receiving step of entering light from a light source into said liquid crystal layer via a first polarizing means and receiving, via a second polarizing means, reflected light exited from said liquid crystal layer by reflecting at said reflection region;

a dispersing step of spectrally resolving the reflected light received by said light-receiving means to detect a relation between a wavelength λ and a reflected light intensity;

a wavelength deriving step of finding a wavelength satisfying a polarizing plane-maintaining condition in that said reflected light returns maintaining a same polarizing plane as a polarizing plane at the time of said entering, i.e. that a difference in optical path lengths between an ordinary ray and an extraordinary ray of said reflected light is a sum of an integer multiple of a wavelength and a half-wavelength, or an integer multiple of a wavelength;

$\Delta n \cdot d$ deriving step of finding a reasonable $\Delta n \cdot d$ from the wavelength found by said wavelength deriving step and a known twist angle of said liquid crystal layer to find a relation between the wavelength and $\Delta n \cdot d$ from a plurality of combinations of the wavelength and $\Delta n \cdot d$; and

a thickness deriving step of finding d by assigning a known combination of wavelength λ and Δn to the relation.

2. The method of measuring a thickness according to claim 1, wherein said wavelength deriving step is performed by finding a value of a wavelength at which said reflected light intensity assumes an extreme value.

3. The method of measuring a thickness according to claim 1, wherein a Jones matrix is used in said $\Delta n \cdot d$ deriving step.

4. The method of measuring a thickness according to claim 3, wherein in the case that β/π is n or n+ 1/2 (n is an integer) when $\alpha = \Delta n \cdot d\pi/\Theta\lambda$ ... (equation 1) and $\beta = \Theta\ \sqrt{(1+\alpha^2)}$ ... (equation 2) in which Θ is a known twist angle of said liquid crystal layer, a reasonable value of β/π is found from wavelength λ when a polarizing plane of the reflected light is maintained, said twist angle Θ, and said equations 1 and 2, and a relation between the wavelength and $\Delta n \cdot d$ is found by a calculation from the obtained value of β/π.

5. The method of measuring a thickness according to claim 1, wherein a transmission axis of said first polarizing means and a transmission axis of said second polarizing means are orthogonal to each other.

6. The method of measuring a thickness according to claim 1, wherein a transmission axis of said first polarizing means and a transmission axis of said second polarizing means are parallel to each other.

7. The method of measuring a thickness according to claim 1, wherein when an angle formed by the transmission axis of said first polarizing means and a direction of alignment on a plane of said liquid crystal layer contacting a substrate to which said light enters is assumed to be ϕ, said light-receiving step, said dispersing step and said wavelength deriving step are performed for a plurality of ϕs in a range of 0° to 90°.

8. The method of measuring a thickness according to claim 1, wherein a Cauchy dispersion formula is used in said $\Delta n \cdot d$ deriving step.

9. The method of measuring a thickness according to claim 1, wherein said reflection region has a diffusibility and light is received by said

light-receiving means at a position off a positive reflection direction corresponding to said entering.

10. A device for measuring a thickness, comprising:

a light source;

a first polarizing means for transmitting light from said light source;

a second polarizing means for transmitting reflected light reflected at an object to be measured;

a light-receiving means for receiving said reflected light transmitted through said second polarizing means;

a dispersing means for spectrally resolving the reflected light received by said light-receiving means to detect a relation between a wavelength λ and a reflected light intensity;

a wavelength deriving means for finding a wavelength satisfying a polarizing plane-maintaining condition in that said reflected light returns maintaining a same polarizing plane as a polarizing plane at the time of said entering, i.e. that a difference in optical path lengths between an ordinary ray and an extraordinary ray of said reflected light is a sum of an integer multiple of the wavelength and a half-wavelength, or an integer multiple of a wavelength;

a $\Delta n \cdot d$ deriving means for finding a reasonable $\Delta n \cdot d$ from the wavelength found by said wavelength deriving means and a known twist angle of said liquid crystal layer to find a relation between the wavelength and $\Delta n \cdot d$ from a plurality of combinations of the wavelength and $\Delta n \cdot d$; and

a thickness deriving means for finding d by assigning a known combination of wavelength λ and Δn to the relation.

11. The device for measuring a thickness according to claim 10, wherein said wavelength deriving means is performed by finding a value of a wavelength at which said reflected light intensity assumes an extreme value.

12. The device for measuring a thickness according to claim 10,

wherein a Jones matrix is used in said $\Delta n \cdot d$ deriving means.

13. The device for measuring a thickness according to claim 12, wherein in the case that β/π is n or n+ 1/2 (n is an integer) when $\alpha = \Delta n \cdot d\pi / \Theta\lambda$ ... (equation 1) and $\beta = \Theta \sqrt{(1+\alpha^2)}$ ... (equation 2) in which Θ is a known twist angle of said liquid crystal layer, a reasonable value of β/π is found from wavelength λ when a polarizing plane of the reflected light is maintained, said twist angle Θ, and said equations 1 and 2; and a relation between the wavelength and $\Delta n \cdot d$ is found by a calculation from the obtained value of β/π.

14. The device for measuring a thickness according to claim 10, a transmission axis of said first polarizing means and a transmission axis of said second polarizing means are orthogonal to each other.

15. The device for measuring a thickness according to claim 10, wherein a transmission axis of said first polarizing means and a transmission axis of said second polarizing means are parallel to each other.

16. The device for measuring a thickness according to claim 10, wherein when an angle formed by the transmission axis of said first polarizing means and a direction of alignment on a plane of said liquid crystal layer contacting a substrate to which said light enters is assumed to be ϕ, said light receiving means, said dispersing means and said wavelength deriving means are used for a plurality of ϕs in a range of 0° to 90°.

17. The device for measuring a thickness according to claim 10, wherein said $\Delta n \cdot d$ deriving step uses a Cauchy dispersion formula.

18. The device for measuring a thickness according to claim 10, wherein said reflection region has a diffusibility and light is received by said light-receiving means at a position off a positive reflection direction corresponding to said entering.

19. A method of measuring a thickness d of a liquid crystal layer having alignment-treated upper and lower surfaces and a birefringnet index Δn which is uniform in the thickness direction, in a reflection-type liquid crystal display element including said liquid crystal layer between a pair of substrates and having a reflection region at least in a part of one of said substrates, comprising:

a light-receiving step of entering light from a monochromatic light source, with a wavelength at which birefringent index Δn of liquid crystal is known, into said liquid crystal layer via a first polarizing means and receiving, via a second polarizing means, reflected light exited from said liquid crystal layer by reflecting at said reflection region;

a rotational light-receiving step of receiving light while changing a rotational angle which is an angle formed by said first and second polarizing means and said liquid crystal layer when seen from above, maintaining an angle formed by respective transmission axes of said first polarizing means and said second polarizing means to be constant by engaging with said light receiving step;

an angle deriving step of finding said rotational angle satisfying a polarizing plane-maintaining condition in that said reflected light returns maintaining a same polarizing plane as a polarizing plane at the time of said entering, i.e. that a difference in optical path lengths between an ordinary ray and an extraordinary ray of said reflected light is a sum of an integer multiple of a wavelength and a half-wavelength, or an integer multiple of a wavelength; and

a thickness deriving step of finding d from a reasonable $\Delta n \cdot d$ selected in accordance with a relation between desired wavelength and $\Delta n \cdot d$ derived from an angle found by said angle deriving step and a known twist angle of said liquid crystal layer.

20. The method of measuring a thickness according to claim 19, wherein said angle deriving step is performed by finding a value of said rotational angle at which said reflected light intensity assumes an extreme value.

21. The method of measuring a thickness according to claim 19, wherein a Jones matrix is used to find $\Delta n \cdot d$ in said thickness deriving step.

22. The method of measuring a thickness according to claim 21, wherein in the case that an angle formed by a transmission axis of said first polarizing means and a direction of alignment on an entrance side surface of said liquid crystal layer is assumed to be ϕ, and that a twist angle of said liquid crystal layer is assumed to be Θ, a reasonable value of $\Delta n \cdot d/\lambda$ is found from an angle ϕ at which a polarizing plane of said reflected light is maintained and from a known said twist angle Θ, to find $\Delta n \cdot d$ at a wavelength λ from an obtained value of $\Delta n \cdot d/\lambda$.

23. The method of measuring a thickness according to claim 19, wherein a transmission axis of said first polarizing means and a transmission axis of said second polarizing means are orthogonal to each other.

24. The method of measuring a thickness according to claim 19, wherein a transmission axis of said first polarizing means and a transmission axis of said second polarizing means are parallel to each other.

25. The method of measuring a thickness according to claim 19, wherein said reflection region has a diffusibility and light is received by said light-receiving means at a position off a positive reflection direction corresponding to said entering.

26. A device for deriving an angle, comprising:

a monochromatic light source;

a first polarizing means for transmitting light from said monochromatic light source;

a second polarizing means for transmitting reflected light reflected at an object to be measured;

a light-receiving means for receiving said reflected light transmitted

through said second polarizing means;

a rotational light-receiving means for receiving light while changing a rotational angle which is an angle formed by said first and second polarizing means and said liquid crystal layer when seen from above, maintaining an angle formed by respective transmission axes of said first polarizing means and said second polarizing means to be constant by engaging with said light receiving means; and

an angle deriving means for finding said rotational angle satisfying a polarizing plane-maintaining condition in that said reflected light returns maintaining a same polarizing plane as a polarizing plane at the time of said entering, i.e. that a difference in optical path lengths between an ordinary ray and an extraordinary ray of said reflected light is a sum of an integer multiple of the wavelength and a half-wavelength, or an integer multiple of a wavelength.

27. A device for measuring a thickness, comprising:

a monochromatic light source;

a first polarizing means for transmitting light from said monochromatic light source;

a second polarizing means for transmitting reflected light reflected at an object to be measured;

a light-receiving means for receiving said reflected light transmitted through said second polarizing means;

a rotational light-receiving means for receiving light while changing a rotational angle which is an angle formed by said first and second polarizing means and said liquid crystal layer when seen from above, maintaining an angle formed by respective transmission axes of said first polarizing means and said second polarizing means to be constant by engaging with said light receiving means;

an angle deriving means for finding said rotational angle satisfying a polarizing plane-maintaining condition in that said reflected light returns maintaining a same polarizing plane as a polarizing plane at the time of said entering, i.e. that a difference in optical path lengths between an ordinary

ray and an extraordinary ray of said reflected light is a sum of an integer multiple of the wavelength and a half-wavelength, or an integer multiple of a wavelength;

a $\Delta n \cdot d$ deriving means for finding a relation between a wavelength λ and $\Delta n \cdot d$ from an angle found by said angle deriving means; and

a thickness deriving means for finding d by using wavelength λ and a known Δn.

28. The device for measuring a thickness according to claim 27, wherein said angle deriving means is performed by finding a value of said rotational angle at which said reflected light intensity assumes an extreme value.

29. The device for measuring a thickness according to claim 27, wherein a Jones matrix is used in said $\Delta n \cdot d$ deriving means.

30. The device for measuring a thickness according to claim 29, wherein in the case that an angle formed by a transmission axis of said first polarizing means and a direction of alignment on an entrance side surface of said liquid crystal layer is assumed to be ϕ, and that a twist angle of said liquid crystal layer is assumed to be Θ, a reasonable value of $\Delta n \cdot d/\lambda$ is found from an angle ϕ at which a polarizing plane of said reflected light is maintained and from a known said twist angle Θ, to find $\Delta n \cdot d$ at a wavelength λ from an obtained value of $\Delta n \cdot d/\lambda$.

31. The device for measuring a thickness according to claim 27, a transmission axis of said first polarizing means and a transmission axis of said second polarizing means are orthogonal to each other.

32. The device for measuring a thickness according to claim 27, wherein a transmission axis of said first polarizing means and a transmission axis of said second polarizing means are parallel to each other.

33. The method of measuring a thickness according to claim 27, wherein said reflection region has a diffusibility and light is received by said light-receiving means at a position off a positive reflection direction corresponding to said entering.

34. A device for deriving a wavelength, comprising:

a light source;

a first polarizing means for transmitting light from said light source;

a second polarizing means for transmitting reflected light reflected at an object to be measured;

a light-receiving means for receiving said reflected light transmitted through said second polarizing means;

a dispersing means for spectrally resolving the reflected light received by said light-receiving means to detect a relation between a wavelength λ and a reflected light intensity; and

a wavelength deriving means for finding a wavelength satisfying a polarizing plane-maintaining condition in that said reflected light returns maintaining a same polarizing plane as a polarizing plane at the time of said entering, i.e., that a difference in optical path lengths between an ordinary ray and an extraordinary ray of said reflected light is a sum of an integer multiple of the wavelength and a half-wavelength, or an integer multiple of a wavelength.